

Claims**ART 34 AMDT**

1- A method for downhole spectroscopy processing comprising:

- obtaining raw spectroscopy data using a downhole tool;
- processing downhole the raw spectroscopy data using the downhole tool
- to obtain a downhole processed solution;
- transmitting the downhole processed solution to a surface processing system; and
- using the surface processing system to determine lithology information from the downhole processed solution

wherein processing the raw spectroscopy data comprises:

- pre-processing downhole the raw spectroscopy data to obtain a net capture spectra; and
- performing spectral stripping using time information and the net capture spectra to determine elemental yields.

2- The method of claim 1, wherein processing comprises time-stacking the raw spectroscopy data.

3- The method of claim 1 or claim 2, further comprising comparing the downhole processed solution with data obtained from another downhole tool.

4- The method of any of claims 1-3, further comprising displaying the lithology information on a user interface.

5- The method of any of claims 1-4, wherein processing the raw spectroscopy data further comprises:

- determining dry weight elemental concentrations using the elemental yields;

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determining a dry weight for at least one selected from the group consisting of clay, carbonate, quartz-feldspar-mica, pyrite, anhydride, siderite, salt, and coal using the dry weight elemental concentrations; and

computing a matrix property using the dry weight elemental concentrations.

6- A downhole tool for processing raw spectroscopy data, comprising:

at least one detector for detecting the raw spectroscopy data;

processing means for processing the raw spectroscopy data to produce a downhole processed solution; and

means for transmitting the downhole processed solution to a surface location,

wherein the processing means comprises:

means for pre-processing the raw spectral data to obtain a net capture spectra;

means for performing spectral stripping using time information and the net capture spectra to determine elemental yields

7- The downhole tool of claim 6, wherein the processing means comprises means for determining elemental yields.

8- The downhole tool of claim 6 or claim 7, wherein the processing means comprises means for computing a matrix property.

9- The downhole tool of any of claims 6-8, wherein the processing means further comprises means for determining dry weight elemental concentrations using the elemental yields.

10- The downhole tool of claim 9, wherein the processing means further comprises:

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means for determining a dry weight for at least one selected from the group consisting of clay, carbonate, quartz-feldspar-mica, pyrite, anhydrite, siderite, salt, and coal using the dry weight elemental concentrations; and

means for computing a matrix property using the dry weight.

11- The downhole tool of any of claims 6-10, wherein the processing means comprises:

- a digital signal processor (516);
- a power supply (520) operatively connected to the digital signal processor (516);
- a local memory (518) operatively connected to the digital signal processor (516); and
- a processing interface (514) operatively connected to the digital signal processor (516).

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